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ABSTRACT

Five elementary school groups, or cohorts, were given the Test Anxiety Scale for Children and the Lie Scale for Children on three occasions over a year's time. This paper examines the results cross-sectionally and reveals between-group, or cohort effects. The youngest and oldest cohorts displayed low anxiety. Within-group longitudinal changes did not closely match this cross-sectional difference. Current data was compared to previously published longitudinal studies. Longitudinal anxiety patterns varied across cohorts and samples while defensiveness showed longitudinal decreases across all studies. The consistency in defensiveness results and the lack of consistency in test anxiety results across the three studies suggest that anxiety is more a function of situational factors and that defensiveness is more a function of organismic factors. (Author)

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Cohort Effects in Children's Test Anxiety and Defensiveness

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Abstract

Five elementary school groups, or cohorts, were given the Test Anxiety Scale for Children and the Lie Scale for Children on three occasions over a year's time. The results were examined cross-sectionally and revealed between-group, or cohort effects, i.e., the youngest and oldest cohorts displayed low anxiety while the middle cohort displayed the highest anxiety. Within-group longitudinal changes did not closely match this cross-sectional difference. Current data was compared to previously published longitudinal studies. Longitudinal anxiety patterns varied across cohorts and samples while defensiveness showed longitudinal decreases across all studies.

Cohort Effects in Children's Test Anxiety and Defensiveness

Test anxiety is a personality variable of considerable importance in educational settings. Interest in test anxiety in the elementary school years has been sparked by the finding of a moderately strong relationship between anxiety and performance on ability/achievement tests (Atkinson & Raynor, 1974; Hill & Sarason, 1966). Probably the most commonly used measure in the area is the Test Anxiety Scale for Children (TASC), a 30-item questionnaire dealing with anxiety in an evaluative context (Sarason et al., 1960). The child's anxiety score is simply his number of yes answers, answers on which he admits to worry. Many children are hesitant or unwilling to admit to anxiety, and this defensiveness poses problems for self-report measures of anxiety. Sarason and his colleagues (1960) developed an additional measure to deal with the defensiveness problem, the Lie Scale for Children (LSC). The LSC is an 11-item scale dealing with situations presumed to be anxiety-arousing and common to all children, e.g., "Do you ever worry?". The defensiveness score is the number of "no" items, items on which child denies anxiety when it would be expected. A moderate negative correlation between the TASC and the LSC has been found throughout the elementary school years; children who are highly defensive tend to report less anxiety.

A major longitudinal study of test anxiety was reported by Hill and Sarason (1966) who found that anxiety scores tended to increase and defensiveness scores tended to decrease over time. For example, a group of children who entered grade 1 in 1958 had mean TASC scores of 7.62 in grade 1, 9.66 in grade 3, and 11.12 in grade 5. Another group of children who entered grade 1 in 1957 had mean scores of 10.68 and 11.13 in grades 4 and 6 respectively. In contrast to the general increase in anxiety across the elementary school years, defensiveness showed a decline; mean LSC scores of 5.55, 4.53, and 3.43 for the 1958 Cohort in grades 1, 3, and 5 respectively; mean Lie scores of 4.13 and 3.31 for the 1957 Cohort in grades 4 and 6 respectively.

Interpretation of such longitudinal data is not without its problems. There is an inherent confound between age changes for a group of individuals born at the same point in time, a cohort, and historical events that are concurrent with age-related changes. For example, persons born in 1948 entered college in the middle 1960's. Longitudinally assessed personality change for that cohort might reflect age changes or it might reflect the atmosphere of the college campus in the middle '60's. One way to disentangle the intertwining of age and cohort-specific historical events is to follow different cohorts longitudinally. These cohorts would pass through the same ages but would be exposed, presumably, to

different circumstances. By examining the age-related patterning for disparate cohorts, one can move a step closer to isolating the determinants of the change. If a longitudinal pattern is common across cohorts and situations, its status as a developmental pattern is substantially strengthened.

Cohort has typically been defined by birth year (Schaie, 1965). Cohort can be defined in terms of other relevant events however (Ryder, 1965). In the present study cohort was defined by year of entry into the school system. Presumably the individuals entering grade 1 in a given year share a set of common experiences. Conceivably children entering grade 1 in 1969 share an educational experience that differs from children entering grade 1 in 1970, in spite of the fact that children in both cohorts entered school at a common age. Using this school entry definition of cohort, Hill & Sarason's longitudinal data is based on 1957 and a 1958 cohorts. The children in the present study entered elementary school at least a decade later, and belong to the 1968 to 1972 cohorts. In the present study, a series of short-term longitudinal studies (one year in length) were conducted on five cohorts of elementary school children. The cohorts differed in age by a year, and a cross-sectional comparison of these different-aged cohorts was possible. Furthermore, the patterns of within-cohort or longitudinal change could be evaluated. Both the cross-sectional and longitudinal patterns of test

anxiety will be compared and contrasted with Hill and Sarason's (1966) data.

Method

202 elementary school children were administered the TASC and the LSC on three occasions: May, November, and May in a thirteen month period. At the initial testing, the children were in grades 1 to 5 of an integrated public elementary school in a midwestern community of approximately 100,000 people. These children were grouped into cohorts on the basis of their year of entry into the first grade, ranging from cohort 1968 for the oldest to cohort 1972 for the youngest. Cohort is confounded with age. The oldest cohort was tested in the fifth and sixth grades while the youngest cohort was tested in the first and second grades. However, it should be noted that the cohorts overlap. On the third testing occasion, a given cohort is assessed at the same "age" that the next older cohort was tested on at the first time of test.

The data from such a design can be examined cross-sectionally (between subjects) and longitudinally (within subjects). By taking the mean anxiety and defensiveness scores over the three occasions of measurement, we can construct a cross-sectional picture by comparing the scores of the five cohorts. On the other hand, within-subject changes across the three occasions could be assessed for the entire sample and for individual cohorts.

Hill and Sarason (1966) found a strong sex difference in the pattern of anxiety and defensiveness scores, with boys reporting lower anxiety and higher defensiveness scores. Sex was consequently included as an independent factor in the present study. The resulting ANOVA design was comprised of two between-subject factors, cohort and sex, and one within-subject factor, occasions. Since there were three occasions of measurement, it was possible to analyze for linear and quadratic trends in the reports of anxiety and defensiveness over time.

The analysis involved two parts, a between-group analysis of scores averaged over the three occasions, and a within-group analysis of the linear and quadratic changes in scores (see McCall & Appelbaum, 1973). These analyses were calculated separately for anxiety (TASC) and defensiveness (LSC).

Results

Between-group differences.

Sex. In a replication of Hill and Sarason (1966) findings, females reported higher anxiety, 7.62, than did males, 5.86, F (1, 192) = 6.17, $p < .05$. This sex difference was even stronger for defensiveness, F (1, 192) = 37.86, $p < .0001$, with males reporting more defensiveness, 5.60, than females, 3.66. Sex did not interact with cohort or occasion factors.

Cohort-anxiety. The between group cohort effect is basically a cross-sectional analysis involving the comparison

of different-aged groups. On the basis of Hill and Sarason's longitudinal results, it was expected that the cohort comparison would show an age-related increase in anxiety and decrease in defensiveness with the oldest cohort showing the highest level of anxiety and the lowest level of defensiveness. The cohort effect was highly significant for anxiety, F (4, 192) = 4.63, $p < .01$, but not in the expected pattern. Anxiety showed an inverted-U pattern of scores with the highest anxiety level reported by the 1970 cohort, 9.33, and the lowest anxiety levels reported by the youngest, 1972 cohort, 5.32, and the oldest, 1968 cohort, 5.82. The 1969 and 1971 cohorts had intermediate anxiety means of 6.26 and 6.82 respectively. Thus, the cross-sectional cohort comparison revealed an inverted-U pattern for anxiety scores, and did not support expectations based on Hill and Sarason's 1966 longitudinal data.

Cohort-defensiveness. Defensiveness, which was negatively correlated with TASC, -.50, showed a steadily declining pattern of scores from the youngest to oldest cohorts: 6.12, 5.31, 4.52, 4.17, 3.77. This highly significant, F (4, 192) = 8.34, $p < .0001$, cross-sectional difference was a close match with Hill and Sarason's longitudinal changes in defensiveness.

Within-subject change.

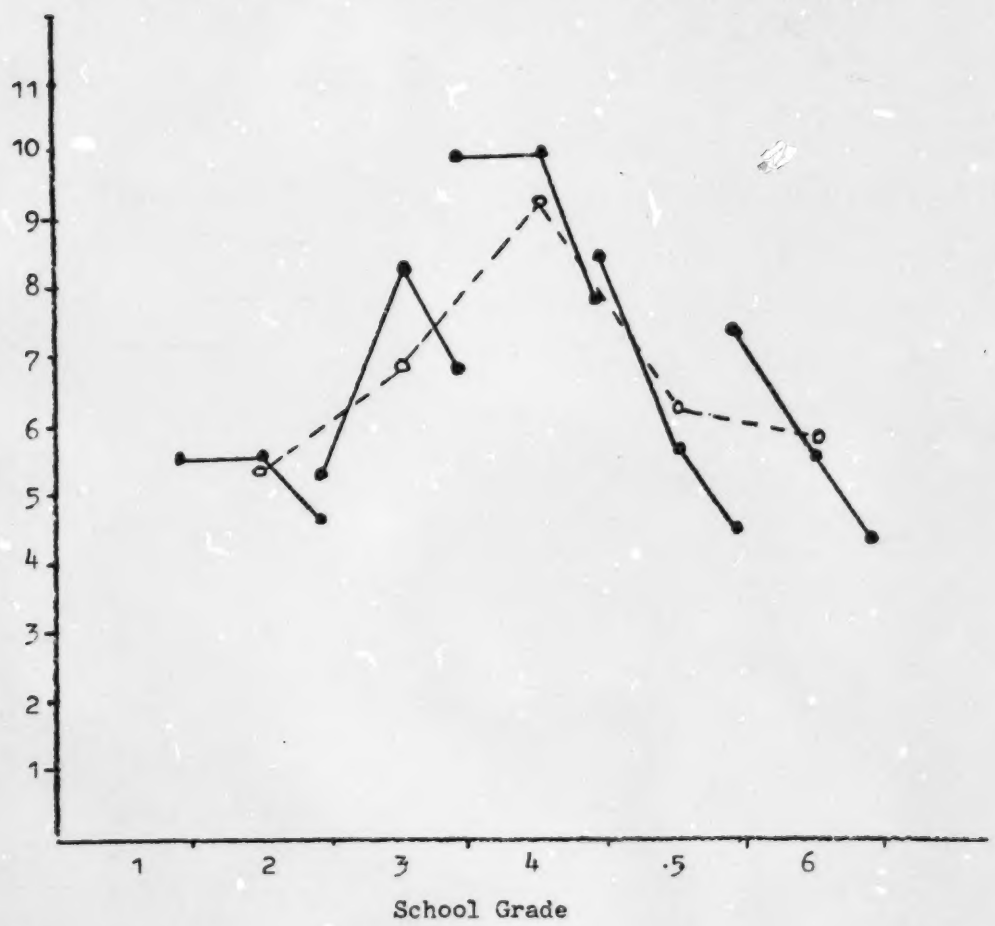
The second step of the analysis addressed within-subject changes and was tested using two multivariate analyses of

variance with cohort and sex as independent variables, and the linear and quadratic trend components as dependent variables (McCall & Appelbaum, 1973).

Anxiety. The highly significant occasions effect, multivariate F (2, 191) = 12.83, $p < .0001$, revealed that subjects changed in the their longitudinal anxiety reports. A highly significant linear change, F (1, 192) = 20.22, $p < .0001$, and a nonsignificant quadratic change, F (1, 192) = 2.01, indicate that the longitudinal change in anxiety was linear. The mean linear change contrast was -1.31 which indicates that for the entire sample of children, anxiety decreased linearly over the year. The occasions by cohort interaction for anxiety was also significant, multivariate F (8, 382) = 3.12, $p < .01$. This cohort by occasions effect was linear, F (4, 192) = 5.10, $p < .0001$. All cohorts except the 1971 cohort showed decreases in anxiety across the year while, the 1971 cohort showed an increase from May to May. The within-cohort changes are illustrated in Figure 1 along with the cross-sectional pattern from the between-groups analysis. The within-cohort changes suggest the possibility of an inverted-U pattern of scores, although this could be due solely to changes in the 1971 cohort. The cross-sectional results imply that grade 1 children will increase in anxiety; this was not the case.

Defensiveness. The overall occasions effect was not significant, F (2, 191) = 2.05, indicating no overall

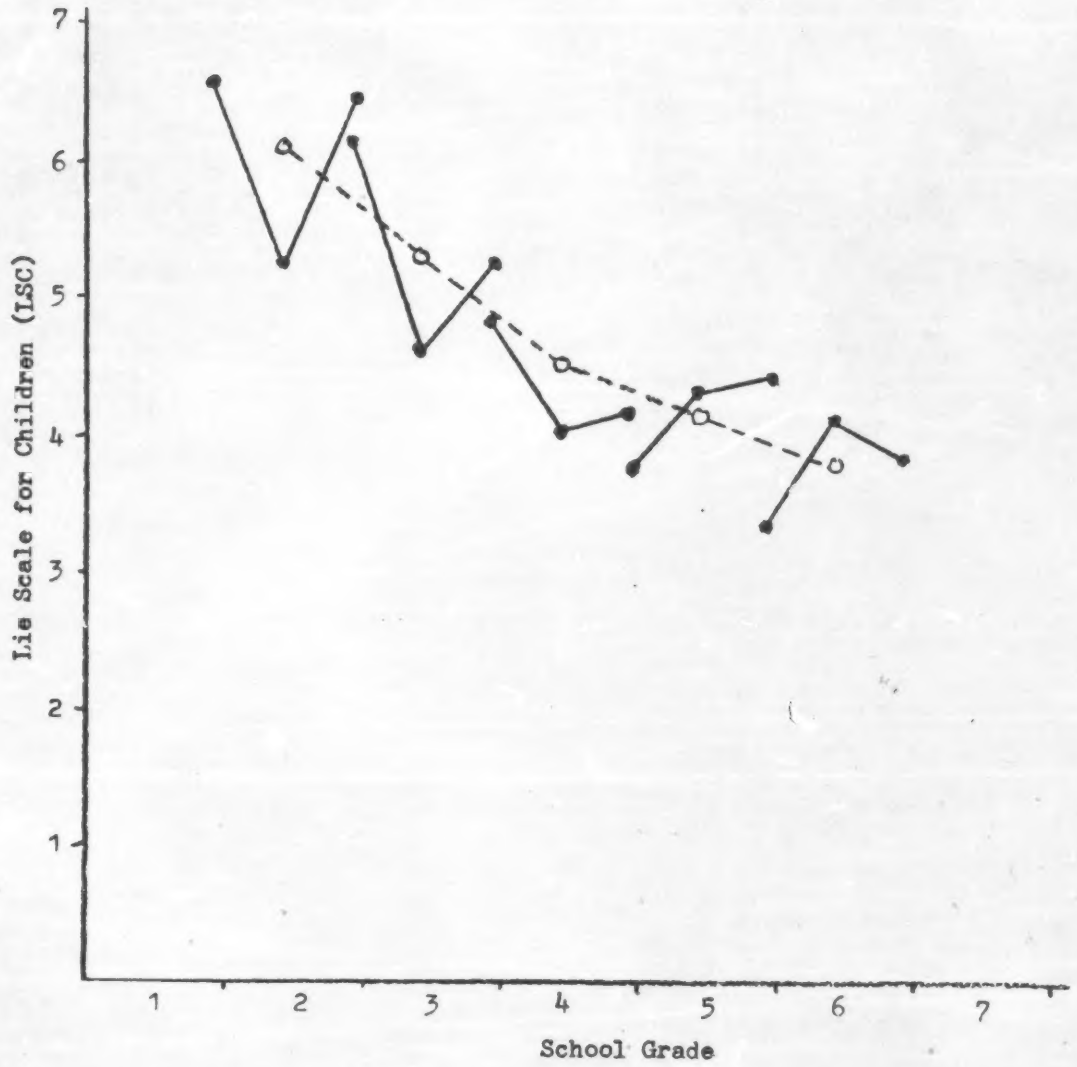
Figure 1. TASC means for between-group, o- - -o (cross-sectional), and within-group, ●——● (longitudinal), contrasts.



within-subject change on report of defensiveness. However, the interaction of cohort with occasions was significant, F (8, 382) = 2.86, $p < .01$. The multivariate effect was due to a significant quadratic component, with the three youngest cohorts showing a U-shaped pattern of longitudinal scores, and the two oldest cohorts showing an inverted U-shaped pattern of longitudinal scores. Within-cohort changes are presented in Figure 2 along with the cross-sectional pattern from the between-group analysis.

Test-retest. A major problem in longitudinal measurement is posed by test-retest effects, i.e., subjects' responses are affected by earlier measurement. It could be argued, for example, that the declines in anxiety scores resulted from previous experience with the test. The current research was not begun with the intention of collecting longitudinal data. As a consequence, no test-retest control group was identified before the first wave of testing, and no completely adequate assessment of the test-retest hypothesis is available. However, on the third occasion of measurement, 20 children who had not been previously tested were tested (in addition to the 202 children in the longitudinal sample). For both the LSC and the TASC these "first-time" children's scores were contrasted with the third occasion scores for the children in the longitudinal sample. For both anxiety, t (220) = .34, and defensiveness, t (220) = .53, there were

Figure 2. LSC means for between-group contrasts (cross-sectional), o- - -o, and within-group contrasts, •———• (longitudinal).



no significant differences between the longitudinal and control children. This analysis, though not conclusive, argues against a test-retest explanation for within-subject changes.

Discussion

Both between-cohort differences and within-cohort changes in test anxiety and defensiveness were examined in this study. The between-cohort differences in anxiety described a curvilinear pattern of scores across the elementary school years with the middle cohort showing the highest anxiety and the youngest and oldest cohorts showing the lowest anxiety scores. The longitudinal assessment of within-subject anxiety change did not closely match the cross-sectional differences; subjects showed a decrease in anxiety. There was, however, an interaction between cohort and occasion, with one cohort, the second youngest, showing an increase in anxiety across the year. Even this atypical cohort, however, declined in anxiety from the November to May period.

The pattern of results for defensiveness was quite different. A highly significant between-group cohort effect revealed a linear decline in defensiveness. At the same time, within-subject changes were limited to an occasion by cohort interaction for the quadratic trend component. While the cohorts showed no overall change in level, the three

youngest cohorts had a U-shaped pattern of defensiveness and the two oldest cohorts had an inverted U-shaped pattern. Thus, the younger cohorts had higher levels of defensiveness while displaying different patterns of change across the year in comparison to older cohorts. The meaning of such a pattern is not clear. Perhaps some sort of cyclic school year phenomenon is interacting with age or previous experience. The fact that the curvilinear pattern differed from younger to older cohorts rules out any simple explanation.

Cohorts were grouped on the basis of school entry year in the present study. The experience of the 1968 cohort may not be all that different from that of the 1969 cohort. By comparing the present findings with other published research, a broader cohort comparison can be achieved. Children in the present study entered school in the late 1960's and early 1970's. Hill and Sarason's (1966) children entered school in the late 1950's. An additional source of longitudinal information on the TASC and LSC is available, the report of a large cross-cultural research project on personality development in Mexican and Texan children by Holtzman and his colleagues (Holtzman, Diaz-Guerrero, & Swartz, 1975). Children in that project began school in the early 1960's and were followed longitudinally for six years. Comparison of the longitudinal TASC and LSC results from the three studies provides a more comprehensive, though informal,

cohort comparison. Commonalities in longitudinal patternings across the three studies would strengthen any claim for developmental status.

Anxiety (TASC) results from the three studies are presented in Figure 3, and no consistent pattern emerges. Stability, increase, and decrease can all be found in the longitudinal patterns. Furthermore, wide variation in the level of anxiety can be found, e.g. Holtzman's Mexican children report much higher anxiety than their Texan counterparts. Little evidence for a developmental pattern in test anxiety can be found.

Defensiveness, in marked contrast to anxiety, shows considerable consistency when the three studies are compared (see Figure 4). LSC longitudinal patterns are generally decreasing across the elementary school years. This consistency is not restricted to pattern, i.e. decreasing anxiety, but also includes absolute level of score. An interesting comparison is available in the Holtzman et al data. Texan and Mexican fourth graders differed considerably on anxiety, with TASC means of 8.9 and 18.2 respectively (almost 2 standard deviations apart). Yet the same children were very close on defensiveness, LSC means of 3.4 and 3.7 (less than ¼ standard deviation apart).

The consistency in defensiveness results and the lack of consistency in test anxiety results across the three

Figure 3. TASC means from three studies: the present study; Hill & Sarason, 1966; Holtzman et al, 1975.

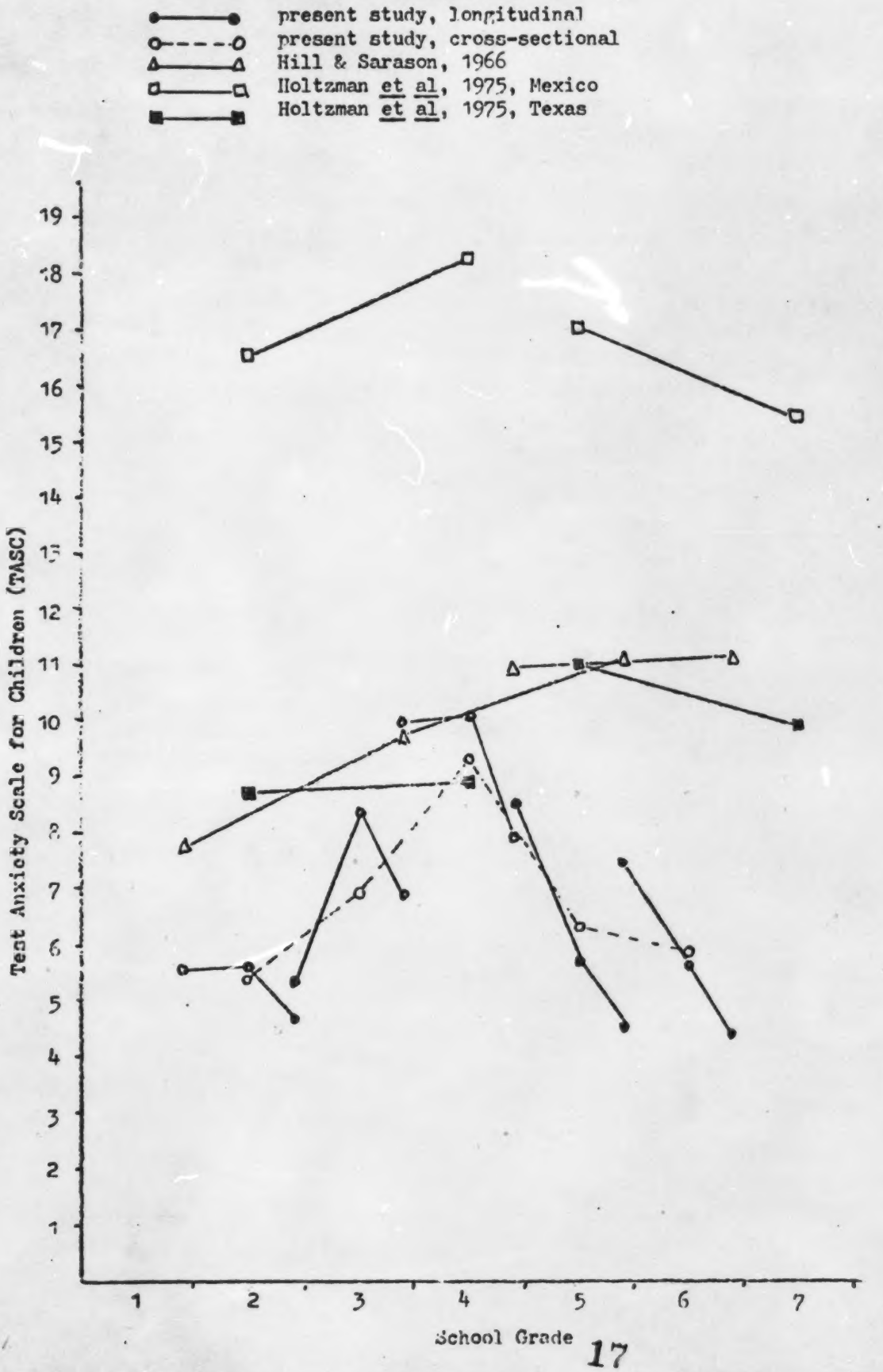
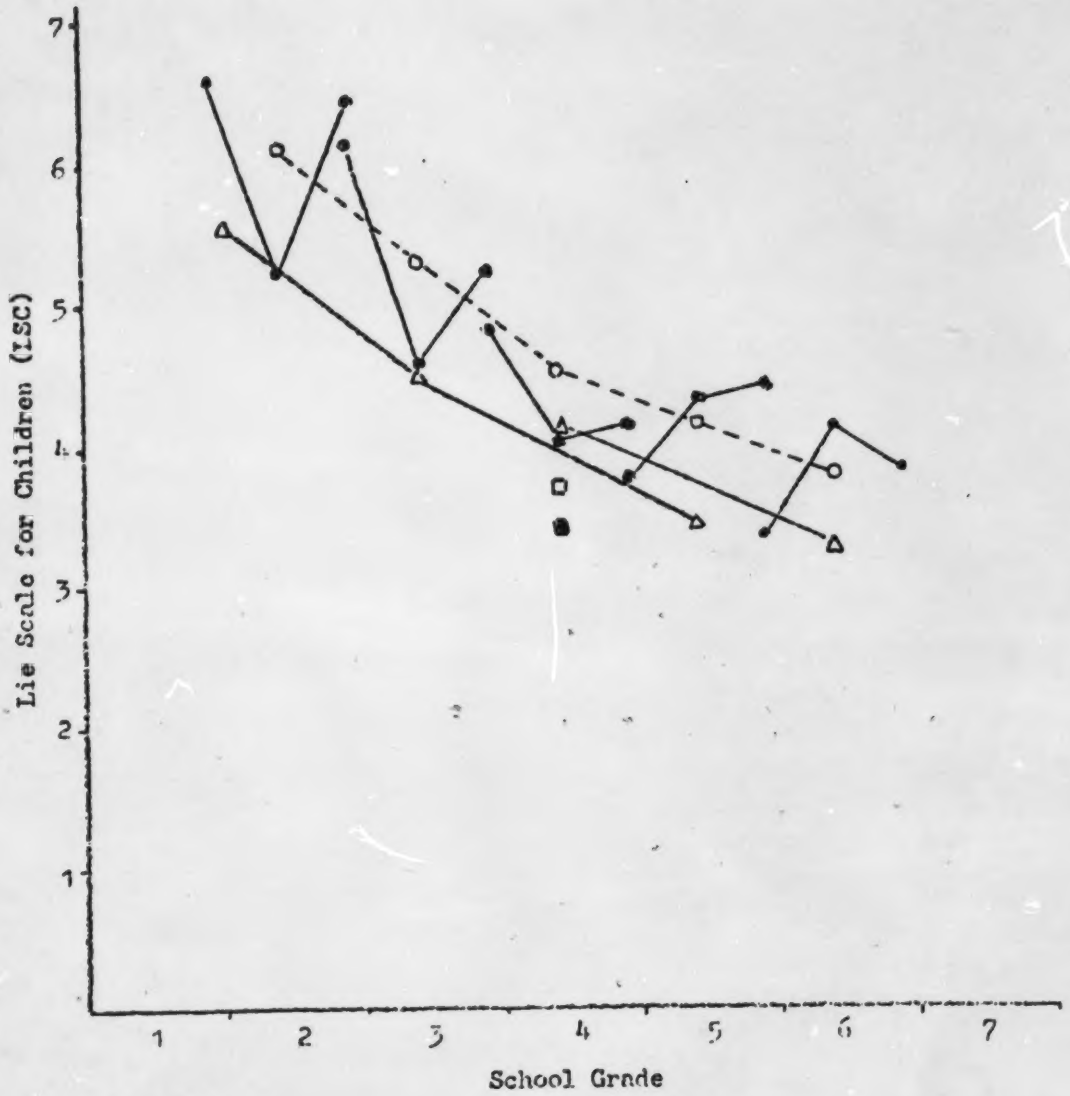


Figure 4. LSC means from three studies: the present study; Hill & Sarason, 1966; Holtzman et al, 1975.

- present study, longitudinal
- present study, cross-sectional
- Hill & Sarason, 1966
- Holtzman et al, 1975, Mexico
- Holtzman, et al, 1975, Texas



studies suggests that anxiety is more a function of situational factors and that defensiveness is more a function of organismic factors. The influence of situations is particularly salient in the Holtzman et al cross-cultural contrast. Defensiveness scores and patterning are very similar across studies, a finding that suggests that defensiveness is age-related. One's score on the defensiveness scale depends on one's willingness to deny anxiety or worry in situations where it is universally expected. As children become more cognitively capable, they are undoubtedly more capable of perceiving the implausibility of asserting that one is never unhappy or worried. So as they grow cognitively, mean defensiveness level drops. Since changing cognitive capacity is common across cohorts, the pattern of results is common across cohorts as well.

The existence of cohort effects serves a cautionary function in warning us against attributing changes to age. Cohort as a variable has little explanatory value. Cohort effects simply suggest developmental patterns are not universal. We must go beyond this discovery to determine what it is about cohort differences that affects behavior. To do that we will need to state our hypothesis, not in terms of unique events such as "1958", but in terms of replicable events.

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